

tion was generally in excess of the average for the month east of the Mississippi River, and from the middle Pacific coast northeastward over the northern plateau region and a part of the northeastern slope of the Rocky Mountains; in the interior and southwestern parts of the country it was deficient. The greatest departures above the average precipitation occurred from central Alabama southeastward over northeastern Florida, where they exceeded six inches, and the most marked deficiencies were noted from central Wyoming eastward to north-central Nebraska, and in the Panhandle of Texas, where they exceeded three inches. On the middle Pacific coast the monthly precipitation was over two and one-half times greater, in the lower lake region and over the northern plateau region more than one-half greater, and in the east Gulf, south Atlantic, and middle Atlantic states, and New England about one-third greater than the average precipitation for May. In the southern plateau region it amounted to about 5 per cent., on the south Pacific coast to about 15 per cent., and on the northeastern and middle-eastern slopes of the Rocky Mountains, the north Pacific coast, and in the extreme northwest to less than 50 per cent. of the usual amount. At Albany, N. Y., Atlantic City, N. J., Jacksonville and Merritt's Island, Fla., Erie, Pa., Forsyth, Ga., Cumberland, Md., Newburyport and Somerset, Mass., Thoruville, Mich., Cooperstown, N. Y., Dyerberry, Pa., and Strafford, Vt., the precipitation was the heaviest, and at Moorhead, Minn., Fort Yates, S. Dak., Fort Wash-

akie, Wyo., Concordia, Kans., Fort Stanton, N. Mex., in Arizona, and at Eola, Oregon, it was the least ever reported for May.

For the period January to May, 1890, inclusive, the precipitation in the Ohio Valley and Tennessee, the lower lake region, over the southeastern slope of the Rocky Mountains, and on the middle Pacific coast was more than one-fourth greater than the average, while in the south Atlantic and east Gulf states, the extreme northwest, the Missouri Valley, the northeastern and middle-eastern slopes of the Rocky Mountains, and on the south Pacific coast it was two-fourths to three-fourths of the average for the period named.

Severe electrical and wind storms were extensively and frequently reported in states lying east of the Rocky Mountains, and well-defined tornadoes were noted in McCulloch county, Tex., on the 1st, in Union, Harrison, and Summit counties, Ohio, on the 10th, and in Gratiot county, Mich., on the 24th, the tornado which passed over Akron, Summit Co., Ohio, on the 10th being an especially noteworthy and clearly-described storm. A remarkable aerolite passed in a northeasterly direction over the northwestern counties of Iowa at about 5.15 p. m. of the 2d, and was observed as far north as southern South Dakota and Minnesota. The meteor exploded with a heavy report before reaching the ground, and fragments were scattered over an area of several square miles in the southwestern part of Winnebago county, Iowa, the largest fragment discovered weighing about seventy pounds.

○ ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for May, 1890, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. The departure of the mean pressure for May, 1890, obtained from observations taken twice daily at the hours named from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me	+ .009	Saint Paul, Minn	+ .002
Boston, Mass	+ .013	Savannah, Ga	— .000
New York City	+ .013	Saint Louis, Mo	— .003
Philadelphia, Pa	+ .008	Galveston, Tex	— .007
Washington City	+ .003	Fort Assiniboine, Mont	— .002
Buffalo, N. Y	+ .004	Santa Fe, N. Mex	— .012
Detroit, Mich	+ .007	Denver, Colo	— .001
Cincinnati, Ohio	+ .001	Salt Lake City, Utah	— .005
Memphis, Tenn	+ .004	Portland, Oregon	— .016
Chicago, Ill	+ .001	San Francisco, Cal	— .014
New Orleans, La	+ .003	San Diego, Cal	— .016

For May, 1890, the mean pressure was highest over the south Atlantic states and along the north Pacific coast, where it was above 30.00, the highest mean reading, 30.05, being noted at Roseburgh, Oregon. The mean pressure was lowest over the western and southeastern parts of the southern plateau region, where it fell below 29.80, the lowest mean reading, 29.78, being noted at El Paso, Tex. Over the north-central part of the country, from the Rocky Mountains to the upper lake region, the mean pressure varied from 29.85 to 29.90.

A comparison of the pressure chart for May, 1890, with that of the preceding month shows a general decrease in pressure, save over eastern Nova Scotia and Cape Breton Island, where the mean pressure was slightly higher than for April. The most marked decrease in pressure occurred over the upper lake region, where it was more than .20, and the decrease exceeded .10, save over the eastern part of New England, and at stations on the Pacific coast and in the adjoining part of the plateau region. There was a decrease of about .10 within the area of low pressure over the southern plateau region; a decrease of about .15 in the area of high pressure over the south Atlantic states; and a decrease of .05 to .10 in the area of high pressure over the north Pacific coast.

The mean pressure was below the normal, except over the

extreme eastern part of New England, over the Canadian Maritime Provinces, over extreme southern Florida, and from the northeastern slope of the Rocky Mountains southwestward to the south Pacific coast. The most marked departures below the normal pressure occurred from the Red River of the North Valley eastward over the upper lake region and southeastward to northern Virginia, and within a small area extending from east-central Texas over northern Louisiana, where they exceeded .05. In sections where the mean pressure was above the normal the departures were less than .05.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In May, 1890, the monthly ranges were greatest in extreme northwestern North Dakota, where they exceeded 1.10, whence they decreased south of east to less than .70 on the coast of southeastern New England, southeastward to less than .40 over extreme southern Florida, southward to less than .50 on the Gulf coast, and southwestward to .30 in southeastern Arizona and on the extreme south Pacific coast, and westward to less than .90 on the Pacific coast north of the Columbia River. Along the Atlantic coast the monthly ranges varied from .39 at Key West, Fla., to .77 at Portland and Eastport, Me.; between the eighty-second and ninety-second meridians, .48 at Tampa, Fla., to .91 at Marquette, Mich.; between the Mississippi River and the Rocky Mountains, .44 at Corpus Christi and Palestine, Tex., to 1.12 at Fort Buford, N. Dak.; in the Rocky Mountain and plateau regions, .30 at Fort Grant, Ariz., to .89 at Rapid City, S. Dak., and .88 at Fort Assiniboine, Mont., and Walla Walla, Wash.; on the Pacific coast, .30 at San Diego, Cal., to .86 at Olympia, Wash.

Chart ii shows that in May, 1890, there was a range in mean pressure of .14 from the east coast of Florida to the north shore of Lake Superior and the upper Missouri valley; a range of .16 from the upper Missouri valley to the north Pacific coast; and a range of .22 from the southern part of the southern plateau region to the extreme south Pacific coast.

AREAS OF HIGH PRESSURE.

Nine areas of high pressure were observed within or near the limits of the United States during the month of May, 1890; compared with the areas of high pressure which were observed during the preceding month they were more numerous but less clearly defined. There has been a slight movement to the northward when compared with the mean track of the areas of high pressure for April, and, as usual with the advance of the season, the barometric changes attending these areas have been less marked. Five of the areas of high pressure observed originated in the region north of Montana and North Dakota; seven passed eastward over the meridian of the Mississippi Valley; six reached the Atlantic coast; while three were traced eastward from the Pacific coast.

The following is a general description of the more important weather conditions attending the transit of these areas of high pressure over the region of observation, as obtained from the regular and special telegraphic reports and reports from voluntary observers:

I.—The month opened with this area of high pressure central over the Dakotas, where killing frosts occurred on the morning of the 1st. The depression which at that time covered the northeast portion of the country moved rapidly to the eastward and was followed by this area of high pressure, which moved over the Lake region to the middle Atlantic states, attended by generally clear weather throughout the Northern States on the 2d. Its easterly course continued, and by the morning of the 3d it had passed to the southeast of Nova Scotia, the barometric pressure increasing slightly during the easterly movement.

II.—This area was at no time central within the limits of the United States, but it appeared on the 2d far to the north of North Dakota, and moved eastward to the north of the Lake region, following the movements of the depression which apparently passed around its southern and eastern quadrants to the Saint Lawrence Valley where it was apparently filled up by the advance of this area of high pressure, and disappeared rapidly during the 4th, and probably did not pass to the eastward of the Saint Lawrence Valley.

III.—The a. m. telegraphic report of the 4th indicated that a belt of high pressure extended across the continent along the fiftieth parallel, and the rapid disappearance of the area previously described was followed by a general increase of pressure over the Rocky Mountain regions, the barometer being highest to the north of Montana on the morning of the 5th, while the cold northerly winds and killing frosts attending this area extended southward over the Missouri Valley to Kansas, and light snows were reported in the upper lake region. The southerly movement of this area continued during the 5th, and on the morning of the 6th it covered the Rocky Mountain regions and extended from Texas to the Dakotas, the barometric pressure being greatest at the extremities of the wave, viz., at Abilene, Tex., and Qu'Appelle, N. W. T., where on the morning of the 6th the barometer read 30.20, while at intermediate points it ranged from 30.10 to 30.16. At the succeeding report these secondary areas had united in the upper Missouri valley, after which the movement was to the south-east, passing over the central valleys on the 7th, the area including within its limits the entire country east of the Rocky Mountains, and drifting slowly to the eastward, reaching the south Atlantic coast on the morning of the 9th. While passing over the Southern States light frosts occurred along the thirty-fifth parallel on the 8th, while the centre of greatest pressure passed over Kentucky, Tennessee, and North Carolina. After reaching the coast line it apparently continued its south-easterly course, and its influence was felt on the coast of Florida until the 11th.

IV.—Was observed to the north of Minnesota on the afternoon of the 9th, when a storm of considerable energy was passing from the lower Missouri valley eastward to the lower lake region. It moved southeastward, covering the Lake region on the morning of the 11th, attended by light frosts and fair

weather in the states of the Ohio and upper Mississippi valleys. After reaching the middle Atlantic states it passed eastward over New England and was central near the coast of Nova Scotia on the morning of the 12th.

V.—This area appeared to the north of western Montana on the 11th, when an extended depression covered the plateau and north Pacific coast regions. Its course was first to the southward, after which it was apparently drawn towards the Pacific coast, where it was apparently re-enforced by an area of high pressure from the Pacific. It remained central over the north Pacific coast region during the 13th and 14th, although it extended eastward and included within its limits the entire eastern slope of the Rocky Mountains. It passed southeastward from British Columbia to eastern Montana on the 15th; to eastern Nebraska on the 16th; and to Tennessee on the 17th, where its course changed to the northeast, it being central in New York on the 18th, and last observed to the east of Nova Scotia on the 19th. The barometric pressure at the centre of this area decreased during its easterly movement until it reached the coast line, and when it disappeared off the Newfoundland coast the pressure observed was the same as that attending this area when central on the north Pacific coast, which was three-tenths of an inch higher than it was when central over Tennessee.

VI.—Appeared to the west of the north Pacific coast on the 16th and was central on the coast of Oregon on the 17th. It extended eastward over the plateau and Rocky Mountain regions, remaining central over the northern plateau region during the 18th. It passed eastward to central Nebraska, covering the eastern slope of the Rocky Mountains, and thence to the central valleys which it covered on the 20th. The track of the centre of this area reached its lowest latitude in central Illinois, from which point it bears to the north of east, passing over the lower lake region, the middle Atlantic states, and southern New England, and thence to the Gulf of Saint Lawrence where it was observed on the 22d. As in the case of number v, the minimum pressure attending the centre of this area was observed in the Mississippi Valley, but the increase of pressure during its easterly movement was more marked, and amounted to over four-tenths of an inch during its transit from the Mississippi to the lower Saint Lawrence valley.

VII.—Was also observed to the west of the Oregon coast, where it remained almost stationary during the 21st, 22d, and 23d. The centre shifted to the northward on the 24th and it remained over British Columbia on the 26th, after which it passed rapidly southeastward to western Nebraska on the 26th and to southern Illinois on the 27th, where, as in the preceding case, the centre reached its lowest latitude. The pressure decreased over three-tenths of an inch during the passage of this area from the north Pacific coast to the Mississippi Valley; owing, however, to the depressions to the east and west, it remained clearly defined and moved slowly towards the Atlantic coast, where it apparently divided during the 29th, the principal area apparently moving to the north of the Saint Lawrence Valley, while a secondary area of slight intensity formed over the Southern States and disappeared during the 30th.

VIII.—This area apparently originated to the east of Hudson Bay and north of the Saint Lawrence Valley. It was observed on the 24th, and moved southward to eastern New England on the 25th, after which it remained almost stationary until the 26th and 27th over the Gulf of Saint Lawrence, when it disappeared, owing to the advance of a depression from the middle Atlantic coast.

IX.—Appeared north of Montana on the 30th, and at the close of the month was apparently moving eastward north of Lake Superior. On the afternoon of the 31st it was central to the north of Manitoba, and extended generally over the north-west and upper lake region.

AREAS OF LOW PRESSURE.

Twelve areas of low pressure were observed within the limits of the United States during the month of May, although

in a number of cases secondary disturbances developed which were sufficiently defined to render it possible to trace them in connection with the movement of the principal disturbances, as will be seen on chart i. As compared with the areas of low pressure which occurred during March, the region of storm frequency has shifted to the northward. No well-defined storm passed over the Southern States east of the Mississippi, while during the month of March four depressions were traced over that region. It will also be seen from chart i that barometric depressions were less frequent on the north Pacific coast, while they were much more frequent over the Lake region and extreme northwest. Compared with the preceding month, the areas of low pressure were more numerous, more irregular in their movements, less frequent on the Pacific coast, and more frequent in the extreme northwest. The general tendency of all disturbances originating in the Rocky Mountain regions and to the westward was towards the Lake region, whether the centre was to the north or south of that latitude, while all moved to the north of east after passing to the east of the Lake region.

The following is a general description of the weather conditions attending the areas of low pressure:

I and II.—The 8 a. m. telegraphic report of the 1st indicated the presence of this depression over the central plateau region, while an area of high pressure was located to the northeast of this region, and a storm of considerable energy was passing off the northeastern coast. By the afternoon of the 1st the disturbance traced as number ii appeared in the northern extremity of the barometric trough which extended over the Rocky Mountain regions, while the first depression was apparently forced southward over Arizona by an increase of pressure in the central Rocky Mountain region. During the 2d the pressure decreased in the Mississippi Valley, the more northerly disturbance passing over Minnesota and Lake Superior, developing considerable energy, while the southerly disturbance could scarcely be defined by barometric lines, although the wind direction and heavy local rains indicated the presence of a feeble disturbance in northeast Texas. The more rapid easterly movement of low area number ii carried this storm to the east portion of the upper lake region, and gave a northeasterly direction to the barometric trough which at that time extended southwestward to Texas. Within this extended depression the movements of this area have been traced, although the slight barometric gradient made it impossible to definitely locate the centre of disturbance. It became elongated to the eastward after reaching the Ohio Valley, forming secondary depressions over the middle Atlantic states and New England during the 4th and 5th, while the principal disturbance moved to the upper Saint Lawrence valley. A depression formed in the southern quadrant of this storm on the 6th, near the middle Atlantic coast, and passed northeastward over New England with considerable force. The rains attending these storms were particularly heavy in many localities on the 5th, in Florida on the 5th and 6th, and the rain area included the greater portion of the country east of the Rocky Mountains. Violent winds occurred in the interior of Texas and Mississippi on the 5th after the passage of this storm to the northeastward.

III.—This disturbance was first located in western Colorado on the 8th, although an extended depression existed over the plateau regions during the previous day, the movements of which are indicated on chart i, and while low area number iii may have resulted from this disturbance, its connection cannot be traced from the regular telegraphic reports. On the morning of the 9th two disturbances were well defined, one central over Nebraska and the other over Wyoming. The latter disappeared apparently by decrease of pressure, while the former passed eastward over the Missouri Valley, attended by destructive winds which caused considerable damage to crops in the Dakotas and adjoining states, necessitating replanting in many cases. Tornadoes also occurred in Missouri, and violent thunder-storms in the upper Mississippi valley, attended by heavy

rains. On the 10th the centre of disturbance was located in northern Indiana, when very heavy rains were reported from the upper Mississippi valley eastward to New York. Destructive gales were also reported in the Lake region, the wind reaching a velocity of sixty miles per hour at Chicago, Ill., on the 10th. As the disturbance approached the Atlantic coast it became more extended and less violent, passing off the coast during the 11th without causing dangerous winds at coast stations.

IV.—Was observed on the north Pacific coast central over Washington on the 10th, although the greater portion of the plateau regions were included within this depression on that date. It advanced rapidly eastward, reaching western Nebraska on the afternoon of the 11th, when the depression was elliptical in form, covering the regions from the Dakotas southward to the Rio Grande Valley. The barometric gradient to the north over the Dakotas and Montana was greatest, and produced violent northerly winds in that section on the 11th and 12th. The depression was apparently forced to the south-eastward, following the general course of the Missouri Valley, by the rapid advance of an area of high pressure from the northwest. It passed over the central Mississippi valley during the 12th, attended by heavy rains as far south as the Gulf States, the rains continuing during the 13th and 14th generally throughout the country east of the Mississippi. The depression passed to the central Saint Lawrence valley on the 14th, where it probably disappeared by increase of pressure.

V.—Appeared to the north of Montana on the 13th and moved rapidly southward towards the Lake region, reaching the upper Mississippi valley on the afternoon of the 14th, thence passing eastward over the Lake region and Ontario, causing moderately strong gales on Lakes Michigan and Erie. It reached the lower Saint Lawrence valley on the 16th, and reports indicate that it ceased to exist while over that section.

VI.—Apparently had its origin to the northward of Minnesota and moved over a course almost parallel to that described for the preceding storm, the centre passing southeastward to Lake Superior, where it was located on the afternoon of the 16th, after which its course changed towards the Saint Lawrence Valley, and as it passed eastward very destructive gales occurred throughout the Lake region, the wind reaching a maximum velocity of fifty-six miles per hour at Alpena, Mich., and forty-eight at Chicago, Ill., and Buffalo, N. Y. It moved northeastward over the Saint Lawrence Valley during the 17th, attended by severe gales, the wind reaching a velocity of sixty-four miles per hour at Montreal, Quebec.

VII.—Appeared north of Montana on the 15th, forming two depressions, one of which passed eastward and disappeared north of North Dakota during the 18th, while the other passed southeastward over the Missouri Valley to Kansas and thence northeastward over the upper lake region during the 18th. After this disturbance reached northern Kansas a second division occurred, one depression moving southward to northern Texas, from which point this secondary disturbance passed northeastward over the Ohio Valley and lower lake region to the Saint Lawrence Valley during the 19th and 20th, leaving, however, a fourth disturbance in the lower Mississippi valley, which moved over the east Gulf states to Georgia, attended by heavy rains. The rainfall was also very heavy in the Ohio Valley and middle Atlantic states on the 19th and 20th. This storm increased in energy after reaching the lower Saint Lawrence valley, and the attending southerly gales extended over the New England coast, while the wind increased to forty miles per hour on the middle Atlantic coast after shifting to northwest.

VIII.—Also appeared north of western Montana, and, as in the preceding case, at once separated, one branch of the disturbance moving eastward north of the stations of observation, continuing this course until it reached the southern extremity of Hudson Bay, where it disappeared on the 23d, while the principal disturbance moved southeast over the Rocky Mountains, reaching southern Nebraska during the 20th, where the course changed to the north of east, and after reach-

ing the Lake region it disappeared, owing to the rapid advance of areas of low pressure to the westward.

IX.—This disturbance apparently developed over the southern plateau region, and moved eastward over Colorado on the 21st and Kansas on the 22d, after which it was apparently forced southward by increased pressure from the Rocky Mountain regions, and disappeared without causing any marked change in the weather conditions of the central valleys.

OX.—This disturbance was at no time central within the limits of stations of observation. It was first observed north of Montana on the 22d, and passed eastward north of the Dakotas during the 23d, attended, however, by violent south to west winds in the Northwest. As this storm approached Lake Superior general rains occurred in the central valleys and strong gales in the Lake region, the wind reaching a velocity of fifty-six miles per hour at Chicago, Ill. After the centre of disturbance reached the vicinity of Lake Superior the direction of movement changed to the northeast and the storm apparently passed over the Hudson Bay region. The general rains extended eastward to the Atlantic coast, the heaviest rain-falls occurring in the south Atlantic states, resulting in some damage to growing crops.

XI.—Was first observed north of Montana on the 26th, and, as in the case of numbers vii and viii, which had their origin in

the same locality, this disturbance quickly separated, forming secondary depressions, first on the 28th when the principal disturbance was apparently central over North Dakota. Minor disturbances were observed in Colorado, southern Minnesota, and to the north of North Dakota. These secondary disturbances disappeared after the 28th, when the principal disturbance moved southward over the Missouri Valley, covering the eastern slope of the Rocky Mountains and greatly elongated in a north and south direction. It was forced southward by an area of high pressure to the northwestward, and after reaching the west Gulf states it could no longer be defined by barometric lines, although heavy rains occurred over Arkansas near the centre of disturbance on the 31st.

XII.—Was a slight disturbance which developed on the middle Atlantic coast on the 27th, within the limits of a trough of low pressure which extended from Florida to northern New York. It apparently passed off the middle Atlantic coast to the northeastward, increasing greatly in energy as it approached Nova Scotia. Strong northerly and westerly gales occurred on the New England coast on the 28th, when the centre was to the south of, and near, Yarmouth, N. S. Marine reports indicate that this storm continued to increase in energy as it approached the Newfoundland coast during the 29th, and westerly gales were reported on that coast on the 30th and 31st.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.			Duration.	Velocity per hour.	Maximum abnormal changes in pressure in twelve hours, with maximum abnormal changes in temperature and maximum wind velocities in connection therewith.												
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.	Rise.			Station.	Date.	Fall.	Station.	Date.	Miles per hour.	Direction.	Station.	Date.				
High areas.		0	0	0	0	Days.	Miles.	Inch.													
I.	1	47	95	40	60	2.0	44	.38	La Crosse, Wis.	1	23	Springfield, Ill.	1	42	ne.	Chicago, Ill.	1				
II.	2	55	104	52	80	1.5	33	.52	Duluth, Minn.	3	30	Huron, S. Dak.	3	52	n.	Huron, S. Dak.	3				
III.	5	54	112	31	77	5.0	24	.40	Calgary, N. W. T.	5	14	Savannah, Ga.	8	40	n.	North Platte, Nebr.	5				
IV.	9	55	99	43	62	3.0	35	.52	Des Moines, Iowa	10	29	Indianapolis, Ind.	10	36	e.	Sandy Hook, N. J.	9				
V.	11	54	113	47	54	8.0	31	.52	Calgary, N. W. T.	14	33	Fort Custer, Mont.	11	48	nw.	Swift Current, N. W. T.	9				
VI.	16	45	139	48	61	6.0	30	.58	Quebec, Quebec	21	32	Northfield, Vt.	20	46	nw.	Bismarck, N. Dak.	14				
VII.	21	44	128	48	77	8.0	20	.38	Fort Custer, Mont.	25	15	Fort Custer, Mont.	25	60	nw.	Huron, S. Dak.	18				
VIII.	24	50	65	46	65	2.5	15	.22	Yarmouth, N. S.	25	17	Father Point, Quebec	25	30	ne.	Bismarck, N. Dak.	25				
IX.	30	54	108	52	95	1.5	18	.42	Swift Current, N. W. T.	29	27	Chicago, Ill.	31	40	ne.	Quebec, Quebec	25				
Mean.	51	116	45	70	4.2	28		.44		24			44			Port Buford, N. Dak.	31				
Low areas.								Fall.		Rise.											
I.	1	38	111	50	62	6.0	26	.26	Baltimore, Md.	4	14	Cleveland, Ohio	5	40	ne.	Quebec, Quebec	5				
II.	1	53	109	45	82	1.5	50	.62	Qu'Appelle, N. W. T.	1	26	Bismarck, N. Dak.	1	42	ne.	Chicago, Ill.	3				
III.	8	40	107	42	79	2.5	30	.42	Fort Sully, S. Dak.	7	24	Rapid City, S. Dak.	7	60	ne.	do	10				
IV.	10	47	120	47	71	4.0	33	.36	North Platte, Nebr.	11	16	Valentine, Nebr.	11	52	n.	Fort Sully, S. Dak.	12				
V.	13	52	108	49	68	2.5	40	.50	Swift Current, N. W. T.	13	22	Rapid City, S. Dak.	13	46	nw.	Bismarck, N. Dak.	14				
VI.	15	55	102	51	68	2.0	40	.46	Qu'Appelle, N. W. T.	15	17	Green Bay, Wis.	16	64	sw.	Montreal, Quebec	17				
VII.	16	51	113	52	60	4.5	38	.44	Concordia, Kans.	17	21	Chicago, Ill.	18	44	w.	Father Point, Quebec	21				
VIII.	19	50	114	52	82	3.5	20	.40	Swift Current, N. W. T.	21	15	do	22	54	sw.	Dodge City, Kans.	20				
IX.	20	38	117	39	99	1.5	33	.30	Denver, Colo.	21	14	Denver, Colo.	21	40	nw.	Omaha, Nebr.	22				
X.	22	52	112	53	86	3.5	20	.50	Port Arthur, Ont.	24	16	Cheyenne, Wyo.	22	60	nw.	Bismarck, N. Dak.	25				
XI.	26	50	112	34	99	4.5	20	.58	Calgary, N. W. T.	26	21	Fort Custer, Mont.	26	56	nw.	Port Buford, N. Dak.	28				
XII.	27	40	74	46	56	3.0	17	.24	Nantucket, Mass.	27	11	Sydney, C. B. I.	30	50	ne.	Nantucket, Mass.	28				
Mean.	47	108	47	76	3.2	31		.42		18			52								

0 NORTH ATLANTIC STORMS FOR MAY, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during May, 1890, are shown on chart i. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Nine depressions have been traced for May, 1890, the average number traced for the corresponding month of the last five years being ten. The greatest number of depressions previously traced for May was eleven, in 1887 and 1888, and the least number was nine, in 1889. Of the depressions traced for the current month four were continuations of areas of low pressure which first appeared over the North American conti-

nent; one apparently originated off the middle Atlantic coast; one first appeared over the southern part of the Banks of Newfoundland; two were first located between the Azores and the British Isles; and one is traced southeastward west of the British Isles. The storms generally pursued irregular paths over mid-ocean and near the British Isles, and but one depression traversed the ocean from coast to coast. Over the western part of the ocean the storm periods were the 5th to 12th, 14th, 17th to 21st, and 25th to 31st, the severest storms occurring south of Newfoundland and over the Grand Banks during the 11th and 12th. Over mid-ocean the weather of the first decade was generally fair and settled, and from the 12th to 15th, 17th, 18th, and 20th to 29th unsettled weather prevailed, the severest storms being reported on the 12th, 13th,